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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/737,182	12/16/2003	Yoshiaki Maruyama	1324.68802	5492

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EXAMINER	
CALEY, MICHAEL H	

ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/737,182	MARUYAMA ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-10, 13, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujioka et al. (U.S. Patent Application Publication No. 2002/0075429 "Fujioka") in view of Ichimura (U.S. Patent No. 6,181,397) and Tsuboyama et al. (U.S Patent No. 4,846,560).

Regarding claims 1 and 3, Fujioka discloses a base substrate for a liquid crystal display having:

a sealing material forming region (Figure 1 region of element 103) provided in a peripheral portion of a base substrate (Figures 1 and 13 element 101);

a display area (Figure 1 element 118) defined within the sealing material forming region; and

a cell gap control layer (Figure 13 element 104), formed in the display area, that reduces a cell gap between the base substrate and an opposite substrate provided opposite to the base substrate, such that the cell gap in the display area where the cell gap control layer is formed is less than a gap in an area outside of the cell gap control layer (Figure 13).

Fujioka fails to explicitly disclose the cell gap control layer as reducing the cell gap in the display area to be greater than 1 micron and less than 2 microns. Fujioka, however, does teach a cell gap of less than 2 microns as within the taught optimization range for the cell gap. Within the optimization range disclosed by Fujioka for the distance D1, Fujioka discloses 5 microns as an acceptable thickness for the sealing material (Figure 13; Page 8 [0107]). Given that the cell gap control layer has a thickness of 3 microns (Page 5 [0076]) and that the color filter, electode, and alignment film layers each have a thickness, the cell gap has a thickness of less than 2 microns when the thickness of the sealing material is 5 microns.

Ichimura further teaches the cell gap as dependent on the type of liquid crystal used in the display. Ichimura teaches a cell gap of 1-2 microns as preferred for a ferroelectric reflective liquid crystal display (Column 6 lines 4-7). Tsuboyama teaches ferroelectric liquid crystal as advantageous for benefits such as a faster response time compared to other types of liquid crystal and bistability (Column 5 line 66 – Column 6 line 17).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the display device disclosed by Fujioka to have a cell gap greater than 1 micron and less than 2 microns. One would have been motivated to form the cell gap to have the proposed thickness when optimizing the display device for a ferroelectric liquid crystal to benefit from a fast switching speed and bistability.

Regarding claim 2, Fujioka discloses the cell gap control layer as formed of a photosensitive resin (Page 5 [0076]).

Regarding claim 4, Fujioka discloses an adhesive which is spread on either of the substrates and which secures the pair of substrates to each other (Page 2 [0014]; Figure 13 element 103).

Regarding claim 6, Fujioka fails to disclose a spherical spacer for maintaining the cell gap in the embodiment of Example 4, Figure 13. In a separate embodiment, however, Fujioka teaches a spherical spacer for maintaining the cell gap (Figure 9 element 116; Page 7 [0097]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to place spherical spacers for maintaining the cell gap of the display device disclosed by Fujioka. One would have been motivated to use spherical spacers to ensure a uniform cell gap between the base substrate and the opposing substrate such that the display characteristics are uniform over the entire display.

Regarding claim 7, Fujioka fails to explicitly disclose the cell gap control layer as having a thickness greater than the cell gap. Fujioka discloses the cell gap control layer as having a thickness of 3 microns (Page 5 [0076]). Fujioka discloses the distance D1 of Figure 13, which includes the thickness of the cell gap control layer, as equal to or greater than 5 microns (Page 8 [0107]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the display disclosed by Fujioka such that the cell gap control layer has a thickness greater than the cell gap. Within the optimization range disclosed by Fujioka for the distance D1, Fujioka discloses 5 microns as an acceptable thickness for the sealing material (Figure 13; Page 8 [0107]). Given that the cell gap control layer has a thickness of 3 microns and that the color filter, electrode, and alignment film layers each have a thickness, the cell gap has a thickness of less than 2 microns when the thickness of the sealing material is 5 microns. One would have been motivated to construct the display according the prescribed range of D1 disclosed by Fujioka to avoid defects in the sealing material (Page 8 [0108]).

Regarding claim 8, Fujioka discloses a sealing material (Figure 13 element 103) formed on the sealing material forming region, wherein a thickness of the sealing material is greater than a thickness of the cell gap control layer (Figure 13).

Regarding claim 9, Fujioka discloses the cell gap between the cell gap control layer and at least one of the substrates includes liquid crystal therein (Figure 13 element 111).

Regarding claims 10 and 13, Fujioka discloses a plurality of gate bus lines formed on the base substrate (Figure 1 element 203, Figure 2A element 203A) and an insulation layer (Figure 2A element 107) provided between the gate bus lines and the cell gap control layer (Figure 2A element 104).

Regarding claims 16 and 17, Fujioka fails to disclose cell gap in the display area as approximately 1.4 microns. The proposed cell gap, however, is within the optimization range as taught by Fujioka, Ichimura, and Tsuboyama (see above).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the display device disclosed by Fujioka to have a cell gap as proposed. One would have been motivated to form the cell gap to have the proposed thickness when optimizing the display device for a ferroelectric liquid crystal to benefit from a fast switching speed and bistability.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujioka in view of Ichimura and Tsuboyama and in further view of Kodate (U.S. Patent No. 5,748,266).

Regarding claim 5, Fujioka fails to disclose a pillar spacer for maintaining the cell gap. Kodate, however, teaches a pillar spacer as an advantageous means of maintaining the cell gap between a base substrate and an opposing substrate by means of pillar spacers (Column 3 line 66 – Column 4 line 30, Column 4 line 65 – Column 5 line 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to place pillar spacers in the display device disclosed by Fujioka as a means of maintaining the cell gap between the base substrate and the opposing substrate. One would have been motivated to use a pillar spacer to maintain a precise gap while avoiding problems associated with spherical spacers due to coagulation and scratching the surfaces of the alignment layer (Column 4 lines 4-16).

Claims 11, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujioka in view of Ichimura and Tsuboyama and in further view of Kim et al. (U.S. Patent No. 6,100,954 "Kim '954").

Fujioka discloses a plurality of drain bus lines formed on the insulation film (Figure 2A element 204a). Fujioka fails to disclose a protection film provided between the drain bus lines and the cell gap control layer and the cell gap control layer as formed directly on the protection film. Kim '954, however, teaches a protection film (Figure 14B element 179) formed between the drain bus lines (Figure 14B element 125) and the cell gap control layer (Figure 14B element 159) such that the cell gap control layer is formed directly on the protection film.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a protection film between the drain bus lines and the cell gap control layer and to form the cell gap control layer directly on the protection film in the display device disclosed by Fujioka. Kim teaches a protection film between the drain bus line and the cell gap control layer as advantageous to eliminate problems such as detachment and charge trap (Kim: Column 18 lines 60-66, Column 12 lines 35-64) caused by the use of an organic cell gap control layer as

used by Fujioka (Kim: Column 18 lines 60-66). One would have been motivated to form a protection film between the drain bus lines and the cell gap control layer and to form the cell gap control layer directly on the protection film in the display device disclosed by Fujioka to maintain a stable characteristic curve of the TFT device and reliable switching according to the teachings of Kim (Figure 14B; Column 12 lines 55-64).

Claims 18-24 and 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujioka in view of Kim and in further view of Ohnuma et al. (U.S. Patent No. 5,381,255 "Ohnuma").

Regarding claims 18-24, 26, 27, and 30-32, Fujioka as modified by Kim discloses all of the proposed limitations except for the protection film as formed throughout the base substrate. Ohnuma, however, teaches a protection film as formed throughout the base substrate to prevent short-circuiting between the upper and lower substrates (Figure 4 element 104a; Column 5 lines 55-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the protection film taught by Kim (Figure 14B element 179) to be formed throughout the base substrate in the display device disclosed by Fujioka. One would have been motivated to form the protection film throughout the base substrate so that it may have the additional function of preventing short-circuiting between the upper and lower substrates according to the teachings of Ohnuma (Column 5 lines 55-57).

Regarding claim 28, Fujioka discloses a sealing material as formed on the sealing material forming region (Figure 13 element 103), wherein a thickness of the sealing material is greater than a thickness of the cell gap control layer (Figure 13).

Regarding claim 29, Fujioka discloses the cell gap between the cell gap control layer and at least one of the base substrate and the opposite substrate as including liquid crystal therein (Figure 13 element 111).

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujioka in view of Kim and Ohnuma and in further view of Kodate.

Fujioka fails to disclose a pillar spacer for maintaining the cell gap. Kodate, however, teaches a pillar spacer as an advantageous means of maintaining the cell gap between a base substrate and an opposing substrate by means of pillar spacers (Column 3 line 66 – Column 4 line 30, Column 4 line 65 – Column 5 line 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to place pillar spacers in the display device disclosed by Fujioka as a means of maintaining the cell gap between the base substrate and the opposing substrate. One would have been motivated to use a pillar spacer to maintain a precise gap while avoiding problems associated with spherical spacers due to coagulation and scratching the surfaces of the alignment layer (Column 4 lines 4-16).

Response to Arguments

Applicant's arguments filed 6/12/06 have been fully considered but they are not persuasive.

Regarding the rejection of claim 1 as unpatentable over Fujioka in view of Ichimura and Tsuboyama, Applicant argues that Fujioka teaches away from a cell gap of 1 to 2 microns due to the size of the spacer (Figures 9 and 10B).

The examiner disagrees with Applicant's arguments and maintains the rejection. In the embodiment of Example 4, Figure 13, the spacer is only present in the sealing material, outside the cell gap area (Page 7 [0104], Page 8 [0107]). The cell gap is 3 microns thinner than the thickness of the sealing material due to the presence of layer 104 (Page 5 [0076]).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (571) 272-2286. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael H. Caley
August 17, 2006
mhc

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PRIMARY EXAMINER